

## CLAIMS

What is claimed is:

1. An initiator node for a storage area network,  
(the node intended to be coupled over a storage area  
network to at <sup>one or more</sup> least one storage node having command  
queue capability, the initiator node comprising:

at least one processor capable of executing  
instructions;

a memory system having stored a current queue ~~to~~  
depth, and a maximum queue depth associated with each  
storage node of the at least one storage node;

at least  
or more  
↓

wherein the memory system stores

instructions for initializing the maximum queue  
depth for the at least one storage node to a value  
dependent on a type of the at least one storage node,

instructions for limiting the number of commands  
queued to a storage node of the at least one storage  
node to the current queue depth associated with the  
storage node, and

instructions for dynamically adjusting the  
current queue depth associated with the storage node  
based upon queue refusals generated by the storage  
node and the maximum queue depth associated with the  
storage node.

2. The initiator node of Claim 1, wherein the  
instructions for dynamically adjusting the current  
queue depth include instructions for adjusting the  
current queue depth associated with a storage node  
downwardly when the current queue depth is greater

6 than a minimum queue depth and the storage node  
7 refuses to queue a command issued by the initiator  
8 node, and for adjusting the current queue depth  
9 upwardly when the current queue depth is less than the  
10 maximum queue depth associated with the storage node  
11 and that storage node has not refused to queue any  
12 commands issued by the initiator node for a determined  
13 period of time.

1 3. The initiator node of Claim 2 wherein the  
2 instructions for dynamically adjusting the current  
3 queue depth include instructions for monitoring  
4 logins, and for adjusting the current queue depth  
5 downwardly when a login by an additional initiator  
6 node is recognized.

1 4. In a storage area network node, a method of  
2 controlling a maximum number of commands queued to a  
3 storage node comprising the steps of:

4 maintaining a maximum queue depth associated with  
5 the storage node and initializing the maximum queue  
6 depth according to a type of the storage node;

7 maintaining a count of outstanding commands that  
8 have been submitted to the storage node;

9 maintaining a current queue depth associated with  
10 the storage node and initializing the current queue  
11 depth to a value not less than a minimum queue depth  
12 nor greater than the maximum queue depth;

13 holding commands for later submission to the  
14 storage node if the count of commands that have been  
15 submitted is greater or equal to the current queue  
16 depth;

17        adjusting the current queue depth associated with  
18        a storage node downwardly when the current queue depth  
19        is greater than the minimum queue depth and the  
20        storage node refuses to queue a command issued by the  
21        initiator node; and

22        adjusting the current queue depth upwardly when  
23        the current queue depth is less than the maximum queue  
24        depth associated with the storage node and the storage  
25        node has not refused to queue any commands issued by  
26        the initiator node for a first predetermined period of  
27        time.

1        5. The method of Claim 4, further comprising the  
2        step of adjusting the current queue depth associated  
3        with the storage node downwardly is permitted to occur  
4        no more than a predetermined number of times in a  
5        second predetermined period of time.

1        6. The method of Claim 5, wherein the  
2        predetermined number of times is one.

1        7. The method of Claim 5, wherein the first  
2        predetermined period of time is adjusted dynamically.

1        8. The method of Claim 5, further comprising the  
2        steps of:

3        maintaining a second maximum queue depth  
4        associated with a second storage node and initializing  
5        the second maximum queue depth according to a type of  
6        the second storage node;

7        maintaining a second count of outstanding  
8        commands, indicating commands that have been submitted  
9        to the second storage node and have not completed; and

10           maintaining a second current queue depth  
11           associated with the second storage node and  
12           initializing the second current queue depth to a value  
13           not less than a minimum queue depth nor greater than  
14           the second maximum queue depth.

1           9. The method of Claim 5, wherein the step of  
2           initializing the current queue depth initializes the  
3           current queue depth to a value dependent upon a number  
4           of initiator nodes known to be logged-in to the  
5           storage area network.

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